FOREIGN TECHNOLOGY DIVISION

Y-CIRCULATOR WITH DIELECTRIC FILLER

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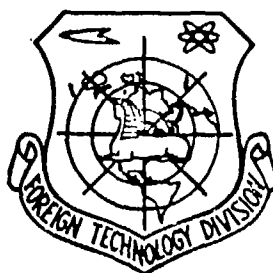
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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	ь ь	*ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

| Russian	English
rot	curl
lg	log

Y-CIRCULATOR WITH DIELECTRIC FILLER

A. K. Stolyarov, I. P. Tyukov, V. N. Shakhgedanov, A. A. Shilova.

The known Y-circulators with ferrite element in the center of branching have low bypass between channels. With relative dielectric constant of ferrite less than five it is impossible to create a circulator with satisfactory electric parameters.

The proposed Y-circulator with dielectric filler is distinguished from those known by the fact that the dielectric constant of ferrite and dielectric, from which the waveguide is made, is selected identical. The makes it possible to reduce the overall dimensions of the Y-circulator.

The described Y-circulator is depicted in the drawing.
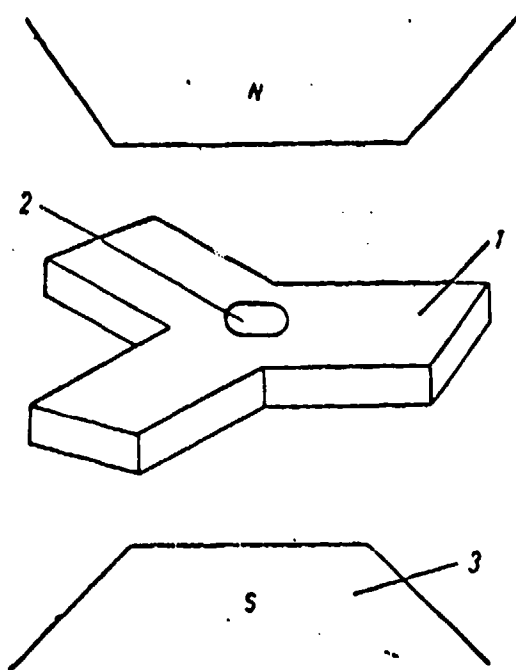
The Y-circulator consists of dielectric symmetric Y-shaped branching 1, ferrite cylinder 2, located in the center of the branching, and permanent magnet 3.

In the Y-circulator only magnetic, and not dielectric properties of ferrite are used. Therefore for elimination of the reflection from [illegible] of ferrite and dielectric it is necessary [illegible] their dielectric constant be identical.

Such a circulator is realized the most successfully if we apply

ruby as the material for the waveguide. The dielectric constant of ruby depends on the direction of cut relative to the crystallographic axes and can be selected within $9.4+11.9_{\varepsilon_0}$ (existing ferrites have $\varepsilon = 10+12\ \varepsilon_0$). Furthermore, ruby has small losses at SHF.

The dimensions of dielectric should be such in order to obtain a single-wave waveguide, i.e., $\sqrt{\varepsilon}$ times less than in the case of air filler.

Subject of invention.

The Y-circulator with dielectric filler with ferrite insert located in the center of the waveguide branching, being distinguished by the fact that for the purpose of reduction of the overall dimensions, the dielectric constant of ferrite and dielectric, from which the waveguide is made, is selected identical.